

REMARKS/ARGUMENTS

New claims 29-53 are supported by the claims as originally filed, by those of the Preliminary Amendment, and by the specification. No new matter has been added.

The rejections over Jones alone and in combination with Akimoto are traversed.

New Claims 29 and 43 are directed to specific methods of modifying and synthesizing a polymeric material, as follows:

29. (New) A method for modifying a polymeric material, comprising:

- introducing the polymeric material into an extruder comprising a feed zone, a compression zone and a discharge zone, and equipped with at least one introduction device comprising a first pump, a second pump, a mixing chamber, a pressure sensor, and an injector,

- introducing into each introduction device:

- at least one chemical compound in the fluidized state via the first pump into the mixing chamber,

- precooled carbon dioxide via the second pump into the mixing chamber,

whereby the chemical compound(s) and the carbon dioxide are mixed in the mixing chamber to provide a mixture,

- introducing the mixture(s) into the interior of the extruder, into a zone of the extruder where the polymeric material is in the fluidized state, via the injector, and

- extruding the polymeric material together with the mixture(s) under conditions permitting reaction between at least one of the chemical compounds and the polymeric material.

43. (New) A method for synthesizing a polymeric material, comprising:

- introducing a material to be polymerized into an extruder comprising a feed zone, a compression zone and a discharge zone, and equipped with at least one introduction device comprising a first pump, a second pump, a mixing chamber, a pressure sensor, and an injector,

- introducing into each introduction device:

- at least one chemical compound in the fluidized state via the first pump into the mixing chamber,

- precooled carbon dioxide via the second pump into the mixing chamber,

whereby the chemical compound(s) and the carbon dioxide are mixed in the mixing chamber to provide a mixture,

- introducing the mixture(s) into the interior of the extruder, into a zone of the extruder where the material to be polymerized is in the fluidized state, via the injector, and

- polymerizing the material to be polymerized together with the mixture(s) in conditions permitting reaction between at least one of the chemical compounds and the material to be polymerized, and

- extruding the resultant polymeric material.

With regard to new claim 29, Jones is not anticipatory. For example, this claim requires, among other things, an extruder comprising a feed zone, a compression zone, and a discharge zone, and further requires extruding the polymeric material together with the mixture(s) under conditions permitting reaction between at least one of the chemical compounds and the polymeric material. Jones does not disclose either of these aspects of the claim.

As for the obviousness of Claim 29 over Jones in view of Akimoto, Jones, the primary reference, relates to the preparation of a foamed thermoplastic mass, starting from thermoplastic molten resins and blends of blowing agents. The blending apparatus of Jones is suitable for mixing diverse volatile liquid blowing agents, at least one of which is normally gaseous (column 3, lines 9-14) for the foaming of thermoplastic mass. There is no suggestion or disclosure in Jones to use the described process for chemically modifying a molten resin.

Akimoto does not disclose a method wherein chemicals are introduced in an extruder via an introduction device equipped with two pumps, a pressure sensor, an injector and a mixing chamber, and does not disclose a method wherein carbon dioxide is mixed in the mixing chamber of an introduction device with a chemical compound. Thus, Akimoto necessarily does not disclose that the carbon dioxide is pre-cooled prior to mixing with the chemical compounds.

Thus, in order to arrive at the invention described in Claim 29 starting from Jones, one skilled in the art would have been required, at a minimum, to contravene Jones' foaming process and somehow choose a process involving chemical modification of a molten resin, choose, against the teachings of Akimoto, blending carbon dioxide with a reactive chemical compound, mix, in the absence of any teaching from Jones or Akimoto, a reactive chemical compound with pre-cooled carbon dioxide in a mixing chamber of an introduction device,

and introduce such a mixture of a reactive chemical and carbon dioxide in an extruder, against Jones' and Akimoto's teachings, in order to effect reaction between the mixture and the molten resin. In view of all these differences, none of which are taught or suggested, it is respectfully submitted that Claim 29 (and claims dependent thereon) are free of rejection over both Jones and Akimoto, either alone or in combination.

With regard to Claim 43, Jones does not disclose a method for synthesizing a polymeric material, wherein a material to be polymerized is extruded together with a mixture of a chemical compound and carbon dioxide under conditions permitting reaction between at least one of the chemical compounds and the material to be polymerized in order to allow polymerization to take place, and the polymerized material to be extruded. Similarly, Akimoto does not disclose a process wherein a material to be polymerized is extruded together with a mixture of chemical(s) and carbon dioxide to obtain a polymeric material, and there is no suggestion either in Jones or in Akimoto to apply the disclosed processes to effect polymerization of a material to be polymerized in an extruder. For example, in order to arrive at the present invention starting from Jones, one skilled in the art would have been required, at a minimum, to:

- use the injection device of Jones and apply it to an extruder;
- choose, against the teachings of Akimoto, blending carbon dioxide with a reactive chemical compound;
- introduce in the extruder, against Jones' and Akimoto's teachings, a material to be polymerized and not a polymeric material, as both of these documents suggest.

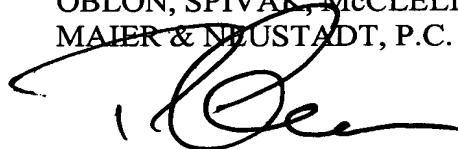
In view of all these differences, none of which are taught or suggested, it is respectfully submitted that Claim 43 (and claims dependent thereon) are free of rejection over both Jones and Akimoto, either alone or in combination.

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Accordingly, and in view of the significant differences between the claimed invention and the disclosures of the prior art, Applicants respectfully request the reconsideration and withdrawal of the outstanding rejections and the passage of this case to issue.

Respectfully submitted,

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